

IN THE CLAIMS:

1.-2. (Cancel).

3. (Withdrawn) A reciprocating piston compressor with stepless capacity control having an unloader (2) attached on at least one automatic suction valve (1) of the compressor whereby said unloader (2) keeps open at least one sealing element (5) of said suction valve (1) throughout a thereby controllable portion of the working cycle of the compressor by means of an unloading piston (4) biased by gas pressure via a switchable control valve (3), wherein there is a dependency

a) in volume to be discharged consisting of the stroke volume of the unloading cylinder (6) and the clearance volume between the control valve (3) and the unloading piston (4),

b) the cross section of the opening of the control valve (3),

c) the gas used for actuation of the unloader (2) whereby the theoretic discharge time of the entire volume to be discharged is maximal nearly equal or less than twice the duration of a working cycle of the compressor.

4. (Withdrawn) A compressor according to claim 3, whereby the clearance volume between control valve (3) and unloading piston (4) is maximal nearly equal or smaller than twice the stroke volume of said unloading cylinder (6).

5. (Withdrawn) A compressor according to claim 3, whereby the guide of said unloader (2) forms one structural unit together with the unloading cylinder (6) and/or the unloading piston (4).

6. (Withdrawn) A compressor according to claim 5, whereby said control valve (3) forms one structural unit together with at least one of the unloading cylinder (6) and unloading piston (4).

7. (Withdrawn) A compressor according to claim 6, whereby said control valve (3) is designed as a solenoid-actuated 3/2-port directional control valve and is preferably switched in such a manner that it acts upon the unloading cylinder (6) with gas pressure while being without electric power.

8. (Withdrawn) A compressor according to claim 7, whereby said control valve (3) is biased at the inlet side with a processing gas being under a corresponding pressure, whereby said control valve is preferably connected to a reservoir volume which is connected in turn to the working chamber of the compressor via a check valve (28).

9. (Withdrawn) A compressor according to claim 8, whereby said unloading piston (4) partially shuts off in its end position the inlet and/or the discharge of the gas biasing said unloading cylinder (6).

10. (New) A method for stepless control of a reciprocating piston compressor which includes a valve catch, a valve seat, a sealing element positioned between the valve catch and the valve seat and biased against the valve seat to close said suction valve, an unloader which is movable

to push the valve element away from the valve seat to open the suction valve, an unloading piston, an unloading cylinder for moving the unloader, the unloading cylinder being biased away from the valve seat and against the unloading piston, and a control valve for controlling flow of actuation gas relative to the piston and the unloading cylinder, the method comprising the steps of:

(a) moving the control valve to a first position wherein actuation gas is prevented from moving the unloading cylinder towards the valve seat so that the sealing element remains in contact with the valve seat to close the suction valve, and

(b) moving the control valve to a second position wherein actuation gas flows to move the unloading cylinder and the unloader towards the valve seat to push the sealing element away from the valve seat and thereby open the suction valve,

the actuation gas having a pressure sufficient to open the suction valve regardless of forces moving the sealing element towards the valve seat during a complete working cycle of the compressor.

11. (New) A method as defined in claim 10, wherein said control valve includes a solenoid, a lower seat, an upper seat, and a switching element, and wherein step (a) includes supplying electrical current to said solenoid to move said switching element to a first location relative to the lower and upper seats, and step (b) includes discontinuing supply of electrical

current to said solenoid to allow said switching element to move to a second location relative to the lower and upper seats.

12. (New) A method as defined in claim 10, comprising the step of supplying said actuation gas from said compressor.